

## PATENT COOPERATION TREATY

PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY



(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 16 MAR 2005

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Applicant's or agent's file reference LU6098		<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. PCT/EP2004/003933		International filing date (day/month/year) 15.04.2004	Priority date (day/month/year) 16.04.2003
International Patent Classification (IPC) or national classification and IPC C08F10/00, C08F2/34, B01J8/24, B01J8/26			
Applicant BASELL POLYOLEFINE GMBH			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 11.09.2004		Date of completion of this report 16.03.2005	
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Kaumann, E Telephone No. +31 70 340-3640 	

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/003933

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-14 as originally filed

**Claims, Numbers**

1-17 as originally filed

**Drawings, Sheets**

1/5-5/5 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/003933

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-14
	No: Claims	15-17
Inventive step (IS)	Yes: Claims	
	No: Claims	1-17
Industrial applicability (IA)	Yes: Claims	1-17
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Subject-matter**

Subject-matter of claims 1 - 13 of the present application is a method for discontinuously metering a solid catalyst (or another process auxiliary) into a fluidized bed reaction zone in a region where a fluid stream (nitrogen, propane) is in each case introduced, so that a region having a reduced particle density is formed in the fluidized bed around the metering point and the catalyst (or the other process auxiliary) is metered at this point. Preferably, the metering point is at a distance of at least one centimeter from the reactor wall.

In one embodiment the fluid stream is introduced concentrically around the metering point for the catalyst (or the other process auxiliary).

This way, the catalyst is carried far away from the reactor wall into the fluidized bed and is distributed well, so that reactor fouling is avoided.

Subject-matter of claim 14 of the present application is a continuous polymerization process wherein the catalyst (or the other process auxiliary) is introduced according to the previous claims.

Subject-matter of claims 15 - 17 of the present application is an apparatus for carrying out the previously described process.

**2. Technical Problem**

The problem was to provide a process wherein reactor fouling is avoided. This aim can be achieved by the claimed process, wherein the freshly added catalyst is taken sufficiently far away from the reactor wall by a surrounding fluid stream of inert gas, so that no hot spots will adhere to the reactor wall.

**3. Reference is made to the following documents:**

D1: EP 0 226 935 (cited in the application)

D2: EP 0 811 637 (cited in the application)

D3 : WO 02/38629

D4 : US 6,088,934

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/EP2004/003933

4. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 15 - 17** is not new in the sense of Article 33(2) PCT. Subject-matter of claims 15 - 17 is mainly a valve unit for introducing portions of a catalyst and/or process auxiliary into a fluidized bed reactor. Moreover the claims comprise a fluidized bed reactor, a reservoir unit, a portioning unit and feed lines, which are obvious features to carry out the claimed process. D4 discloses a nozzle for injecting a liquid directly into a fluidized bed. The used device appears suitable also for the process of the present application.

Therefore, novelty can not be acknowledged to the subject-matter of present claims 15 - 17 in view of D3.

5. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 1 - 14 and 15 - 17** does not involve an inventive step in the sense of Article 33(3) PCT.

**D1** is considered the closest prior art discloses a metering device for introducing a solid powder into pressured vessels, specially a free flowing catalyst powder into a reactor (see col. 2, line 26 to col. 3, line 13 and claims).

Distinguishing feature between the teaching of D1 and the present application is that D1 does not disclose any feature which would avoid that the catalyst comes directly after injection in contact with the reactor wall.

Therefore, the objective technical problem was to modify process according to D1 in such a way, that contact of the freshly introduced catalyst with the reactor wall is avoided.

**D2**, however, discloses a method for injecting a liquid (not a solid) unsupported catalyst into the reaction zone of a fluidized bed reactor.

In a particularly preferred embodiment of D2, the liquid catalyst in the carrier gas is surrounded by at least two gases, the first gas serving primarily to deflect resin particles of the bed out of the path of the liquid catalyst and the second gas primarily prevents the injection tube or nozzle tip from getting clogged. As used in this application, when the liquid catalyst in the carrier gas is surrounded by two gases, the catalyst is considered to be shrouded.

**D3** discloses a gas phase polymerization process wherein cooled recycle gas is

introduced together with the catalyst into the reactor by means of a plenum, wherein the catalyst is surrounded by at least two gasses, the first gas (preferably flowing through the plenum) serving to deflect resin particles of the bed out of the path of the catalyst and the second gas (preferably flowing through the support tube) primarily prevents the injection tube or nozzle tip from getting clogged (see § 0008 - §0018).

The catalyst may also be present in powder form (see §0099).

Therefore, it was obvious to the skilled person to modify the process and the device according to D1 in such a way, as it is disclosed in D2 and D3, in order to arrive at a process, wherein the introduced catalyst is protected by inert gases and does not come in contact with the reactor wall.

Therefore, an inventive step can not be acknowledged to the subject-matter of present claims 1 - 14 and 15 - 17.

6. Since the gas phase polymerization of olefins is an important industrial process, industrial applicability can be acknowledged.

#### **Re Item VIII**

#### **Certain observations on the international application**

The application does not meet the requirements of Article 6 PCT, because **claim 9** is not clear.

According to claim 9, the fluid stream is formed by one or more inert gases from the group consisting of C<sub>2</sub>-C<sub>3</sub>-alkenes and N<sub>2</sub>.

However, C<sub>2</sub>-C<sub>3</sub>-alkenes are not considered as inert gases but as monomers.

Applicant's attention is drawn to the fact that the application may not be amended in such a way that its content extends beyond the content of the application as filed (Article 19(2) PCT).

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/003933

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08F10/00 C08F2/34 B01J8/24 B01J8/26

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08F B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 226 935 A (BASF AG) 1 July 1987 (1987-07-01) cited in the application column 2, line 26 - column 3, line 13 claims	1-15
Y	EP 0 811 637 A (UNION CARBIDE CHEM PLASTIC) 10 December 1997 (1997-12-10) cited in the application page 9, line 48 - line 51; claims	1-15
Y	WO 02/38629 A (UNIVATION TECH LLC) 16 May 2002 (2002-05-16) paragraph [0008] - paragraph [0018] paragraph [0099]; claims	1-15
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

4 August 2004

Date of mailing of the international search report

13. 08. 2004

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/003933

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 088 934 A (NEWTON DAVID) 18 July 2000 (2000-07-18)	1-14
X	the whole document -----	15-17
A	DE 199 58 604 A (TARGOR GMBH) 21 June 2001 (2001-06-21)	1-15
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A	US 4 238 453 A (BOSSCHE HENRI A VAN DEN) 9 December 1980 (1980-12-09)	1-15
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003933

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003933

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